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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,248	02/18/2004	Gerard Harbers	LUM-03-08-01 US	4994
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EXAMINER				
LOUIE, WAI SING				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/782,248

**Applicant(s)**

HARBERS ET AL.

**Examiner**

Wai-Sing Louie

**Art Unit**

2814

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 and 43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 and 43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 17-18, 21, 27-30, 32, 34, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (US 7,084,435) in view of Mueller-Mach et al. (US 6,696,703).

With regard to claim 1, 17, 28, 30, and 43, Sugimoto et al. disclose a light-emitting device 10 (col. 7, line 21 et seq. and fig. 25) comprising:

- A light-emitting diode 2 (col. 7, line 24 and col. 13, line 39 and fig. 25) comprising a blue light gallium nitride-based semiconductor chip having a light-emitting surface S that emits light into a medium (air layer between substrate 1 and optical member 4, see fig. 25). Inherently, a blue-light GaN semiconductor LED emits a range of wavelengths (as evidence reference Reeh et al. US Patent 6,576,930 disclose a GaN blue-light LED from 400 to 500 nm in fig. 7) and the refractive index of air is 1.0 (as evidence reference Yasukawa et al. US Patent 6,774,405 disclose the refractive index of air is 1.0 in col. 5, line 20);
- A collimating optical element 4 (col. 8, lines 1-17) disposed to receive the light having only the range of wavelengths emitted from the light-emitting surface S of

the chip 2 (fig. 25), where the medium is disposed between the entrance surface of the optical element 4 and the light-emitting surface S of the chip 2 (fig. 25).

- Sugimoto et al. disclose a phosphorus layer formed in the optical member, but do not disclose a wavelength converting layer that forms a light-emitting surface. However, Mueller-Mach et al. disclose a phosphorus layer 21 formed on top of the LED structure 2, where the phosphorus layer 21 is a light-emitting surface (Mueller-Mach col. 3, lines 62-67). Mueller-Mach et al. teach the LED comprising a phosphorus thin film could convert primary light emitted by the LED into other wavelength of light to product light of a particular color (Mueller-Mach col. 2, lines 20-24). Therefore, it would have been obvious to one of ordinary skill in the art to modify Sugimoto's device with the teaching of Mueller-Mach et al. to form a wavelength converting layer that forms a light-emitting surface in order to product light of a particular color.

With regard to claim 2, in addition to the limitations disclosed in claim 1 above, Sugimoto et al. also disclose:

- Sugimoto et al. do not disclose the collimating optical element 4 and the chip 2 are separated by a distance that is less than or equal to approximately 50% of the width of the chip 2. However, it would have been obvious to one of ordinary skill in the art to use any suitable distances for the device, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

With regard to claims 3, 18, and 32, Sugimoto et al. disclose the collimating optical element is a lens (col. 7, line 57).

With regard to claims 4, 21, and 34, Sugimoto et al. disclose a holding element 9 that holds the collimating optical element 4 (col. 16, line 27 and fig. 30).

With regard to claim 27, Sugimoto et al. disclose an array of chips 2 is not covered by an encapsulant (fig. 7).

With regard to claim 29, Sugimoto et al. disclose the ambient environment is air (col. 15, line 9).

Claims 5, 22, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (US 7,084,435) modified by Mueller-Mach et al. (US 6,696,703) as applied to claims 1, 17, and 31 above, and further in view of Waitl et al. (US 6,610,563).

With regard to claims 5, 22, and 35, Sugimoto et al. do not disclose a ring shape notch that holds the lens. However, Waitl et al. disclose a holding element (housing) 3 that holds the collimating lens 16, where the ring shape holding element 3 include a notch 6 and the lens has a tab 18 that is held in the notch (Waitl col. 6, line 54 and fig. 2). Waitl et al. teach the ring shape notch traps the casting compound 14 that may overflow the edge (Waitl col. 6, lines 53-54). Therefore, it would have been obvious to one of ordinary skill in the art to modify Sugimoto's device with the teaching of Mueller-Mach et al. and Waitl et al. to provide a ring shape notch to trap the casting compound 14 that may overflow the edge.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (US 7,084,435) modified by Mueller-Mach et al. (US 6,696,703) and Waitl et al. (US 6,610,563) as applied to claim 5 above, and further in view of Ishinaga (US 6,180,962).

With regard to claim 6, Song modified by Waitl discloses the LED chip 1 is held and mounted inside a ring element 3 (Waitl fig. 2a), but do not disclose the chip is mounted by reflow soldering. However, Ishinaga discloses the LED chip is soldered onto the base by reflow soldering process (Ishinaga col. 4, lines 11-12). Ishinaga teaches using the reflow process is less likely to damage the semiconductor chip (Ishinaga col. 2, lines 30-32). Thus, it would have been obvious to one of ordinary skill in the art to modify Sugimoto's device with the teaching of Mueller-Mach et al., Waitl et al., and Ishinaga to use reflow soldering process to mount the LED chip onto the submount 31 in order to not to damage the chip. Waitl et al. disclose the chip 11 is mounted on the submount 3 and the submount 3 is mounted on housing 3' (Waitl fig. 2c).

Claims 7-16, 19-20, 23-26, 31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (US 7,084,435) modified by Mueller-Mach et al. (US 6,696,703) as applied to claims 1, 17, and 31 above, and further in view of Wu (US 6,769,773).

With regard to claims 7, 20, and 33, Sugimoto et al. do not disclose a second collimating optical element disposed over the collimating optical element 4 such that the collimating optical element 4 is disposed between the second collimating optical element and the chip 2. However, Wu discloses a second collimating optical element 442 (Wu col. 2, lines 55-64 and fig. 5). Wu teaches the second collimating optical element is for focusing the light beam (Wu col. 2, lines 40-42). Thus, it would have been obvious at the time the invention was made to modify

Sugimoto's device with the teaching of Mueller-Mach et al. and Wu to provide a second collimating optical element disposed over the collimating optical element 4 such that the collimating optical element 4 is disposed between the second collimating optical element and the chip 2 in order to focus the light beam emitted by the chip 2.

With regard to claims 8-10, 12, 15-16, 23-26 in addition to the limitations disclosed in claim 1 above, Sugimoto et al. modified by Wu disclose:

- An array of light-emitting diodes 201, 202, and 203 emit light into the ambient environment (Wu fig. 2);
- An array of collimating optical element 12R, 12B, and 12G being disposed to receive the light emitted from the light-emitting surface of an associated chip (Wu fig. 2);
- An integral array lens 14R, 14B, and 14G (Wu fig. 2).

With regard to claim 11, Sugimoto et al. modified by Wu disclose at least one chip 202 is displaced laterally with respect to the center of the associated collimating optical element 12G (Wu fig. 2).

With regard to claim 13-14, Sugimoto modified by Wu discloses a digital-micro-display (DMD) including fluorescent plate to convert the UV light from the light source 70 to emit red, blue and green light (Wu col. 3, lines 36-60 and fig. 10).

With regard to claims 19 and 31, in addition to the limitations disclosed in claim 1 above, Sugimoto et al. modified by Wu disclose:

- A micro-display 16 disposed to receive light emitted from the light-emitting surface of the chip 70 after passes through the collimating optical element 741 (Wu fig. 7).

### *Response to Arguments*

Applicant's arguments filed 4/14/08 have been fully considered but they are not persuasive.

- Applicant has amended claims 1, 17, and 31 to include "a wavelength converting layer that forms a light-emitting surface that emits light having only the range of wavelengths". However, Sugimoto et al. modified by Mueller-Mach et al. disclose a wavelength converting layer that forms a light-emitting surface. Please see the rejection above.
- Applicant states that claim 2 has been amended in the remarks, however, in the claims section, claim 2 is previously presented. Therefore, the rejection of claim 2 is the same as previous office action.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is 571-272-1709. The examiner can normally be reached on 7:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wai-Sing Louie/  
Primary Examiner, Art Unit 2814

Wsl  
July 4, 2008.